

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.

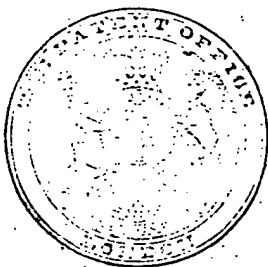


PATENT SPECIFICATION

642,700

DRAWINGS ATTACHED.

Inventors:—ALAN BERNARD TOMLINSON and GERARD GEORGE ELMS.



Date of filing Complete Specification: March 18, 1958.

Application Date: March 18, 1957. No. 5888/57.

Complete Specification Published: Dec. 9, 1959.

Index at Acceptance:—Class 99(1), G(2A:2F:5C:21A).

International Classification:—F63L

COMPLETE SPECIFICATION.

Improvements in or relating to Pipe End Fittings.

We, ROLLS-ROYCE LIMITED, of Nightingale Road, Derby, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to end fittings for metal pipes for the purpose of securing the end of such pipe to a body in a fluid-tight manner to permit flow of fluid between the interior of the pipe and an aperture in the body.

Such fittings find application in aero engine installations, for example, in the fuel system of the engine, where pipes are provided for conveying fuel from one part of the fuel system to another.

The present invention relates particularly to end fittings of the type in which a cylindrical sealing sleeve is adapted to receive the end of the pipe, the sleeve terminating in a radial flange which is secured by threaded securing means such as setscrews or the like to a body with the bore of the pipe aligned with an aperture in the body through which fluid passes. Such a pipe end fitting will be referred to as "a pipe end fitting of the type described".

According to the present invention a pipe end fitting of the type described comprises a cylindrical flanged ferrule adapted to be secured integrally to the pipe end and received within said sealing sleeve, a sealing ring of rubber being provided between the ferrule and the internal surface of the sealing sleeve, and a retaining sleeve adapted to embrace the sealing sleeve and having at one end an intumed flange to trap the flange on the ferrule between itself and the end of said sealing sleeve, the retaining sleeve

also having a radial flange portion which is adapted to bear against the radial flange on the sealing sleeve, said flange on said sealing sleeve having a plane surface adapted to bear against a plane surface on the body to which the pipe is secured, said radial flanges on the retaining and sealing sleeves being adapted to be secured together and to the body by threaded securing means. In using the term "rubber" we include rubbers natural and synthetic. The cylindrical flanged ferrule is secured to the pipe end integrally by means such as brazing or welding.

According to a feature of the invention the inside diameter of the retaining sleeve is made slightly greater than the outside diameter of the sealing sleeve so that a clearance is provided between the two sleeves to assist in insulating the rubber sealing ring from high temperatures externally of the fitting.

In a preferred arrangement the end of the ferrule terminates within the sealing sleeve and the flange on the sealing sleeve is provided at the end thereof remote from the pipe, the end fitting thus terminating in a plane surface, and the fitting is secured to the body by setscrews. Thus, freeing of the fitting by removal of the setscrews permits removal of the pipe together with its fitting without necessitating a movement axially of the pipe.

A preferred embodiment of the invention will now be described with reference to the drawings accompanying the Provisional Specification in which:—

Figure 1 is an axial section through a pipe end fitting; and

Figure 2 is a section on the line 2—2 of Figure 1.

[Price 3s. 6d.]

In the Figures the pipe is indicated at 10 and has an end fitting indicated generally at 11 which is secured by setscrews 12 to a body or boss 13 having a passageway 13a with which the pipe 10 communicates.

The end fitting comprises a sealing sleeve 14 consisting of a cylindrical portion 14a having at one end a radial flange 14b and, received within the cylindrical portion 14a, a ferrule 15 brazed to the end of the pipe 10 at 15a. The external surface of the ferrule has two rectangular section circumferential grooves 15b in each of which is received a rubber sealing ring 16 compressed between the inner surface of the sealing sleeve and its containing groove to form a fluid-tight seal between the sleeve and ferrule 15. The ferrule 15 also has an annular flange 15c on its external surface at a position axially spaced from the grooves 15b.

Encircling the cylindrical portion 14a on the sealing sleeve 14 is a retaining sleeve 17 having a cylindrical portion 17a terminating at one end in a radial flange 17b and at the other end in an intumed flange 17c.

The fitting 11 is secured to the boss 13 by means of two setscrews 12 which pass through aligned apertures in the flanges 14b and 17b. To assist in sealing between the plane surfaces on the boss 13 and flange 14b respectively a rubber sealing ring 18 is provided in a circumferential groove 12b, one side of which is provided by a retaining tube 19 received against a stepped portion 13c on the boss. The retaining tube is trapped in position by a radially inward extension 14c of the flange 14b.

Axial disengagement of the ferrule from the sealing sleeve is prevented by the flange 15c being trapped between the right hand end of the sealing sleeve and the intumed flange 17c on the retaining sleeve.

To accommodate relative thermal expansion and also any manufacturing tolerances a clearance is provided between the flange 15c and the flange 17c on one side and the right hand end of the sleeve 14 on the other side and between the left hand end of the ferrule 15 and the flange 14c.

The internal surface of the cylindrical portion 17a of the retaining sleeve 17 is slightly greater in diameter than the external surface of the sealing sleeve 14 so that a radial clearance 19a is provided therebetween. The clearance acts to insulate the rubber sealing rings 16 in the event of the retaining sleeve being exposed to high temperatures.

WHAT WE CLAIM IS:—

1. A pipe end fitting of the type in which a cylindrical sealing sleeve is adapted to receive the end of the pipe the sleeve terminating in a radial flange which is secured by threaded securing means to a body with

the bore of the pipe aligned with an aperture in the body through which fluid passes, which end fitting comprises a cylindrical flanged ferrule adapted to be secured integrally to the pipe end and received within said sealing sleeve, a sealing ring of rubber being provided between the ferrule and the internal surface of the sealing sleeve, and a retaining sleeve adapted to embrace the sealing sleeve, and having at one end an intumed flange to trap the flange on the ferrule between itself and the end of said sealing sleeve, the retaining sleeve also having a radial flange portion which is adapted to bear against the radial flange on the sealing sleeve, said flange on said sealing sleeve having a plane surface adapted to bear against a plane surface on the body to which the pipe is secured, said radial flanges on the retaining and sealing sleeves being adapted to be secured together and to the body by threaded securing means.

2. A pipe end fitting as claimed in Claim 1 in which the inside diameter of the retaining sleeve is made slightly greater than the outside diameter of the sealing sleeve so that a clearance is provided between the two sleeves to assist in insulating the rubber sealing ring from high temperatures externally of the fitting.

3. A pipe end fitting as claimed in either preceding claim in which the end of the ferrule terminates within the sealing sleeve and the flange on the sealing sleeve is provided at the end thereof remote from the pipe, the end fitting thus terminating in a plane surface, and the fitting being secured to the body by setscrews, on removal of which the pipe fitting can be freed without moving the pipe axially.

4. A pipe end fitting as claimed in any preceding claim in which clearances are provided between the flange on the ferrule and the end of the sealing sleeve on the one side and the trapping flange on the retaining sleeve on the other.

5. A pipe end fitting as claimed in any preceding claim in which there is more than one rubber sealing ring between the ferrule and sealing sleeve.

6. A pipe end fitting as claimed in any preceding claim in which a rubber sealing ring is provided between the radial flange on the sealing sleeve and the body to which the said flange is secured.

7. A pipe end fitting of the type described such fitting being substantially as described with reference to the drawing accompanying the Provisional Specification.

F. J. CLEVELAND & CO.,
Chartered Patent Agents,
29 Southampton Buildings,
Chancery Lane,
London, W.C.2.

PROVISIONAL SPECIFICATION.

Improvements in or relating to Pipe End Fittings.

We, ROLLS-ROYCE LIMITED, of Nightingale Road, Derby, a British Company, do hereby declare this invention to be described in the following statement:—

5 This invention relates to end fittings for metal pipes for the purpose of securing the end of such pipe to a body in a fluid-tight manner to permit flow of fluid between the interior of the pipe and an aperture in the body.

10 Such fittings find application in aero engine installations, for example, in the fuel system of the engine, where pipes are provided for conveying fuel from one part of the fuel system to another.

15 The present invention relates particularly to end fittings of the type in which a cylindrical sealing sleeve is adapted to receive the end of the pipe, the sleeve terminating in a radial flange which is secured by setscrews or the like to a body with the bore of the pipe aligned with an aperture in the body through which fluid passes. Such a pipe end fitting will be referred to as "a pipe end fitting of the type described".

20 According to the present invention a pipe end fitting of the type described comprises a cylindrical flanged ferrule adapted to be secured as by brazing or welding to the pipe end and received within said sealing sleeve, a sealing ring of rubber or like material being provided between the ferrule and the internal surface of the sealing sleeve, and a retaining sleeve adapted to embrace the sealing sleeve and having at one end an 25 intumed flange to trap the flange on the ferrule between itself and the end of said sealing sleeve, the retaining sleeve also having a radial flange portion which is adapted to bear against the radial flange on the sealing sleeve, said flange on said sealing sleeve having a plane surface adapted to bear against a plane surface on the body to which the pipe is secured, said flanges being adapted to be secured together and to the body by means of setscrews or the like.

30 According to a feature of the invention the inside diameter of the retaining sleeve is made slightly greater than the outside diameter of the sealing sleeve so that a clearance is provided between the two sleeves to assist in insulating the rubber sealing ring from high temperatures externally of the fitting.

35 In a preferred arrangement the end of the ferrule terminates within the sealing sleeve and the flange on the sealing sleeve is pro-

vided at the end thereof remote from the pipe, the end fitting thus terminating in a plane surface, and the fitting is secured to the unit by setscrews. Thus, freeing of the fitting by removal of the setscrews permits removal of the pipe together with its fitting without necessitating a movement axially of the pipe.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings in which:—

Figure 1 is an axial section through a pipe end fitting; and

Figure 2 is a section on the line 2—2 of Figure 1.

70 In the Figures the pipe is indicated at 10 and has an end fitting indicated generally at 11 which is secured by setscrews 12 to a boss 13 having a passageway 13a with which the pipe 10 communicates.

The end fitting comprises a sealing sleeve 14 consisting of a cylindrical portion 14a having at one end a radial flange 14b and, received within the cylindrical portion 14a, a ferrule 15 brazed to the end of the pipe 10 at 15a. The external surface of the ferrule has two rectangular-section circumferential grooves 15b in each of which is received a rubber sealing ring 16 compressed between the inner surface of the sealing sleeve and its containing groove to form a fluid-tight seal between the sleeve and ferrule 15. The ferrule 15 also has an annular flange 15c on its external surface at a position axially spaced from the grooves 15b.

Encircling the cylindrical portion 14a on the sealing sleeve 14 is a retaining sleeve 17 having a cylindrical portion 17a terminating at one end in a radial flange 17b and at the other end in an intumed flange 17c.

The fitting 11 is secured to the boss 13 by means of two setscrews 12 which pass through aligned apertures in the flanges 14b and 17b. To assist in sealing between the plane surfaces 13a and 14c on the boss 13 and flange 14b respectively a rubber sealing ring 18 is provided in a circumferential groove 13b, one side of which is provided by a retaining tube 19 received against a stepped portion 13c on the boss. The retaining tube is trapped in position by a radially inward extension 14c of the flange 14b.

110 Axial disengagement of the ferrule from the sealing sleeve is prevented by the flange 15c being trapped between the right hand end of the sealing sleeve and the intumed flange 17c on the retaining sleeve.

115 To accommodate relative thermal expansion and also any manufacturing tolerances

4 a clearance is provided between the flange 15c and the flange 17c on one side and the right hand end of the sleeve 14 on the other side and between the left hand end of the ferrule 15 and the flange 14c. 10

5 The internal surface of the retaining sleeve is slightly greater in diameter than the external surface of the sealing sleeve so that a radial clearance is provided there-

between. The clearance acts to insulate the rubber sealing rings 16 in the event of the retaining sleeve being exposed to high temperatures.

CLAREMONT HAYNES & CO.,
Vernon House, Sicilian Avenue,
Bloomsbury Square, W.C.1,
Applicants' Solicitors.

Abingdon: Printed for Her Majesty's Stationery Office, by Burgess & Son (Abingdon), Ltd.—1959.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2,
from which copies may be obtained.